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| Term | Documents |
|---|-----------|
| GZU-\$ | 0 |
| GZU-\$ | 0 |
| UZU-?-N | 0 |
| UZU-?-N | 0 |
| (GZU-\$ OR UZU-?-N).USPT,JPAB,EPAB,DWPI,TDBD. | 0 |
| (GZU-\$ OR UZU-?-N).USPT,JPAB,EPAB,DWPI,TDBD. | 0 |

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[US Pre-Grant Publication Full-Text Database](#)
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L40

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DATE: Monday, September 02, 2002
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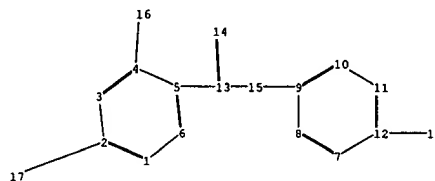
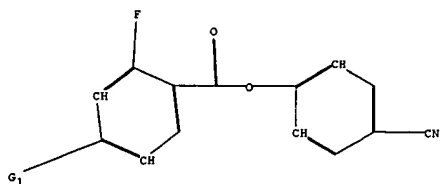
result set

DB=USPT,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ

| | | | |
|------------|---|----|------------|
| <u>L40</u> | gzu-\$ or uzu-?-N | 0 | <u>L40</u> |
| <u>L39</u> | us-5156763-\$.did. or us-5334327-\$.did. or jp-09157654-\$.did. | 5 | <u>L39</u> |
| <u>L38</u> | 14 with polyimide | 49 | <u>L38</u> |
| <u>L37</u> | l34 and alignment layer | 2 | <u>L37</u> |
| <u>L36</u> | L34 and alingment layer | 0 | <u>L36</u> |
| <u>L35</u> | L34 and thickness | 2 | <u>L35</u> |
| <u>L34</u> | US-4974940-\$.did. | 2 | <u>L34</u> |

| | | | |
|------------|--|-------|------------|
| <u>L33</u> | US -4974940-\$.did. | 0 | <u>L33</u> |
| <u>L32</u> | l26 and alignment layer | 0 | <u>L32</u> |
| <u>L31</u> | l26 and thickness | 2 | <u>L31</u> |
| <u>L30</u> | L13 and thickness | 18 | <u>L30</u> |
| <u>L29</u> | l22 and l15 and twist angle and l4 | 7 | <u>L29</u> |
| <u>L28</u> | L26 and l4 | 0 | <u>L28</u> |
| <u>L27</u> | L26 and thickness | 2 | <u>L27</u> |
| <u>L26</u> | us-5188758-\$.did. or us-4799774-\$.did. | 3 | <u>L26</u> |
| <u>L25</u> | L24 and l23 | 4 | <u>L25</u> |
| <u>L24</u> | L22 same twist angle | 730 | <u>L24</u> |
| <u>L23</u> | L22 same l15 | 23 | <u>L23</u> |
| <u>L22</u> | liquid crystal\$ layer | 19872 | <u>L22</u> |
| <u>L21</u> | L20 and stn | 1 | <u>L21</u> |
| <u>L20</u> | us-5578241-\$.did. | 2 | <u>L20</u> |
| <u>L19</u> | l17 and stn | 8 | <u>L19</u> |
| <u>L18</u> | L17 and twist angle | 8 | <u>L18</u> |
| <u>L17</u> | L15 and l4 | 13 | <u>L17</u> |
| <u>L16</u> | L15 and l7 | 2 | <u>L16</u> |
| <u>L15</u> | surface tilt angle | 252 | <u>L15</u> |
| <u>L14</u> | L13 and stn | 16 | <u>L14</u> |
| <u>L13</u> | L2 and l4 | 38 | <u>L13</u> |
| <u>L12</u> | l2 same l4 | 5 | <u>L12</u> |
| <u>L11</u> | L10 and alignment layer | 70 | <u>L11</u> |
| <u>L10</u> | l2 and stn | 143 | <u>L10</u> |
| <u>L9</u> | L8 and twist angle | 1 | <u>L9</u> |
| <u>L8</u> | L7 and l4 | 9 | <u>L8</u> |
| <u>L7</u> | alignment layer with inside surface | 60 | <u>L7</u> |
| <u>L6</u> | l4 same inside surface | 2 | <u>L6</u> |
| <u>L5</u> | L4 and l3 | 32 | <u>L5</u> |
| <u>L4</u> | alignment layer with thickness | 388 | <u>L4</u> |
| <u>L3</u> | L2 same liquid crystal\$ | 571 | <u>L3</u> |
| <u>L2</u> | surface with tilt angle | 3568 | <u>L2</u> |
| <u>L1</u> | de-4100287-\$.did. | 2 | <u>L1</u> |

END OF SEARCH HISTORY



chain nodes :

13 14 15 16 17 18

ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12

chain bonds :

2-17 4-16 5-13 9-15 12-18 13-14 13-15

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

exact/norm bonds :

2-17 9-15 13-14 13-15

exact bonds :

4-16 5-13 12-18

normalized bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

G1:C,H,O

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom
12:Atom 13:CLASS 14:CLASS 15:CLASS 16:CLASS 17:CLASS 18:CLASS

AN 1989:644891 CAPLUS
 DN 111:244891
 TI The synthesis and transition temperatures of some fluoro-substituted
 4-cyanophenyl and 4-cyanobiphenyl-4'-yl 4-pentyl- and 4-butoxybenzoates
 AU Gray, G. W.; Hird, M.; Lacey, D.; Toyne, K J.
 CS Sch. Chem., Univ. Hull, Hull, HU6 7RX, UK
 SO Mol. Cryst. Liq. Cryst. (1989), 172, 165-89
 CODEN: MCLCA5; ISSN: 0026-8941
 DT Journal
 LA English
 CC 75-11 (Crystallography and Liquid Crystals)
 Section cross-reference(s): 25
 AB A series of 4-cyanophenyl 4-X-benzoates and a series of
 4-cyanobiphenyl-4'-yl 4-X-benzoates (X = pentyl, butoxy) were prepd.
 without fluoro-substitution and with mono-fluoro to tetra-fluoro-
 substitution; all possible combinations of substitution patterns at the
 positions ortho- to the cyano group and ortho- to the carboxylate group
 were obtained in an attempt to det. the structural features which are
 responsible for some members of these series showing very large pos.
 values of dielec. anisotropy. The synthesis of novel precursors required
 for the prepn. of these esters is described and the m.ps. and transition
 temps. of the esters are discussed and an explanation is provided for the
 variation of nematic-isotropic transition temp. with position and extent
 of fluoro-substitution.
 ST fluoro substituted cyanophenyl cyanobiphenyl alkoxybenzoate mesophase;
 nematic fluoro substituted phenyl biphenyl benzoate
 IT **Liquid crystals**
 (fluoro-substituted cyanophenyl and cyanobiphenyl alkoxybenzoates,
 prepn. and properties of)
 IT Esterification
 (of alkyl and alkoxy benzoic acids and their derivs. with
 hydroxybenzonitrile and cyanohydroxybiphenyl and their fluoro derivs.)
 IT 82380-18-5
 RL: RCT (Reactant)
 (alkalilation or esterification of)
 IT 767-00-0 19812-93-2 26311-45-5
 RL: RCT (Reactant)
 (esterification of)
 IT 5720-07-0P, 4-Methoxyphenylboronic acid
 RL: PREP (Preparation)
 (prep. and reaction of bromofluorobenzonitrile or
 bromodifluorobenzonitrile)
 IT 121219-25-8P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and carboxylation of)
 IT 123843-65-2P
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and conversion of, to nitrile)
 IT 123843-67-4P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and coupling of, with methoxyphenyl boronic acid)
 IT 105942-08-3P, 4-Bromo-2-fluorobenzonitrile
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and coupling of, with pentynylzinc chloride)
 IT 121219-23-6P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and dehydration of)
 IT 123843-66-3P 123843-68-5P 123864-93-7P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and demethylation of)
 IT 367-24-8P, 4-Bromo-2-fluoroaniline
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and diazotisation-cyanation of)
 IT 67567-26-4P, 4-Bromo-2,6-difluoroaniline

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and diazotization-cyanation of)

IT 1498-96-0P 123843-53-8P 123843-54-9P 123843-55-0P 123843-56-1P
 123843-57-2P 123843-58-3P 123843-59-4P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and esterification of)

IT 121219-24-7P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and hydrogenation of)

IT 123843-60-7P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and hydrogenation or hydrolysis of)

IT 123843-63-0P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and hydrolysis of)

IT 49763-64-6P 54887-92-2P 59443-80-0P 59443-82-2P 86786-89-2P
 94610-83-0P 123843-69-6P 123843-70-9P 123843-71-0P
123843-72-1P 123843-73-2P 123843-74-3P 123843-75-4P
 123843-76-5P 123843-77-6P 123843-78-7P 123843-79-8P 123843-80-1P
 123843-81-2P 123843-82-3P 123843-83-4P 123843-84-5P 123843-85-6P
 123843-86-7P 123843-87-8P 123843-88-9P 123843-89-0P 123843-90-3P
 123843-91-4P 123843-92-5P 123843-93-6P 123843-94-7P 123843-95-8P
 123843-96-9P 123843-97-0P 123843-98-1P
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and **liq. crystal** properties of)

IT 123843-64-1P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and lithiation-carboxylation of)

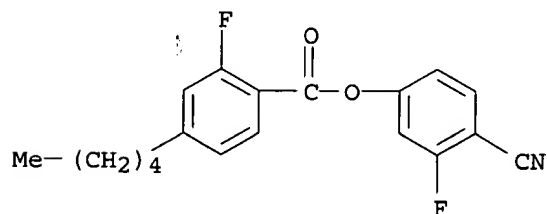
IT 123843-62-9P
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of)

IT 123843-61-8
 RL: RCT (Reactant)
 (prepn. and hydrolysis of)

IT **123843-72-1P**
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and **liq. crystal** properties of)

RN 123843-72-1 CAPLUS

CN Benzoic acid, 2-fluoro-4-pentyl-, 4-cyano-3-fluorophenyl ester (9CI) (CA
 INDEX NAME)



AN 1990:118462 CAPLUS
 DN 112:118462
 TI Preparation of laterally fluorinated 4-cyanophenyl and 4'-cyanobiphenyl benzoates as **liquid crystal** materials
 IN Gray, George William; Lacey, David; Toyne, Kenneth Johnson; Hird, Michael; McDonnell, Damien Gerard
 PA United Kingdom Secretary of State for Defence, London, UK
 SO PCT Int. Appl., 42 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM C07C121-75
 ICS C09K019-20
 CC 25-18 (Benzene, Its Derivatives, and Condensed Benzenoid Compounds)
 Section cross-reference(s): 75
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 8908102 | A1 | 19890908 | WO 1989-GB178 | 19890221 |
| | W: GB, JP, KR, US | | | | |
| | RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE | | | | |
| | EP 407438 | A1 | 19910116 | EP 1989-904111 | 19890221 |
| | EP 407438 | B1 | 19950104 | | |
| | R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE | | | | |
| | JP 03503637 | T2 | 19910815 | JP 1989-503580 | 19890221 |
| | JP 2863235 | B2 | 19990303 | | |
| | CA 1332740 | A1 | 19941025 | CA 1989-591980 | 19890224 |
| | GB 2233649 | A1 | 19910116 | GB 1990-18359 | 19900817 |
| | GB 2233649 | B2 | 19911106 | | |
| | US 5156763 | A | 19921020 | US 1990-571590 | 19900830 |
| | US 5334327 | A | 19940802 | US 1992-881670 | 19920512 |
| PRAI | GB 1988-4330 | | 19880224 | | |
| | WO 1989-GB178 | | 19890221 | | |
| | US 1990-571590 | | 19900830 | | |
| OS | MARPAT 112:118462 | | | | |
| GI | | | | | |

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB The title compds. (I; R = R1, R1O, R1CO2; R1 = C1-12 alkyl; n, m = 0, 1 provided that n + m = 0, 1; a, b, c, d, = 0, 1 with the proviso that a + b + c + d .noteq. 0, excluding the case when a, b, m = 0 and 1 of c, d = 0) were prepd. by esterification of benzoic acids II with cyanophenols III or IV (R2 = H, F; R as above) (prepns. given) by a general method. A soln. of dicyclohexylcarbodiimide in dry CH2Cl2 was added dropwise to a stirred mixt. of II, III or IV, and 4-(N-pyrrolidino)pyridine in CH2Cl2 at room temp. and stirred overnight to give I. I are constituents of **liq .cryst.** material mixts. useful for nematic **liq. crystal** devices, e.g., electro-optic display. Approx. 30 I were prepd. and **liq.-cryst.** properties of 15 I were given.

ST cyanofluorophenylbenzoate prepn nematic **liq crystal**;
 phenylbenzoate cyanofluoro prepn nematic **liq crystal**;
 biphenylbenzoate fluorocyano prepn nematic **liq crystal**

IT **Liquid crystals**
 (nematic, fluorinated cyanophenylbenzoates)

IT 104-92-7, 4-Bromoanisole 110-62-3, Pentanal
 RL: RCT (Reactant)
 (Grignard reaction of, in prepn. of nematic **liq. crystal**)

IT 5419-55-6, Tri-isopropyl borate
 RL: RCT (Reactant)

(Grignard reaction of, with bromoanisole, in prepn. of nematic liq. crystal)

IT 461-96-1, 1-Bromo-3,5-difluorobenzene
 RL: RCT (Reactant)
 (Grignard reaction of, with pentanal, in prepn. of nematic liq. crystal)

IT 348-54-9, 2-Fluoroaniline 5509-65-9, 2,6-Difluoroaniline
 RL: RCT (Reactant)
 (bromination of, in prepn. of nematic liq. crystal)

IT 124-38-9, Carbon dioxide, reactions
 RL: RCT (Reactant)
 (carboxylation by, of difluoroanisole, in prepn. of nematic liq. crystal)

IT 93343-10-3, 3,5-Difluoroanisole
 RL: RCT (Reactant)
 (carboxylation of, in prepn. of nematic liq. crystal)

IT 109-65-9, 1-Bromobutane
 RL: RCT (Reactant)
 (etherification by, of difluorophenol, in prepn. of nematic liq. crystal)

IT 99-96-7, reactions 2713-34-0, 3,5-Difluorophenol 82380-18-5, 2-Fluoro-4-hydroxybenzonitrile
 RL: RCT (Reactant)
 (etherification of, with bromobutane, in prepn. of nematic liq. crystal)

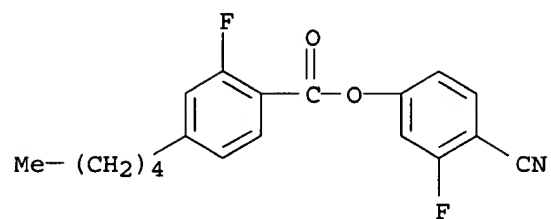
IT 367-24-8P, 4-Bromo-2-fluoroaniline 1498-96-0P, 4-Butoxybenzoic acid 5720-07-0P, 4-Methoxyphenylboronic acid 67567-26-4P, 4-Bromo-2,6-difluoroaniline 105942-08-3P, 4-Bromo-2-fluorobenzonitrile 121219-23-6P 121219-24-7P 121219-25-8P 123843-53-8P 123843-54-9P, 4-Butoxy-2-fluorobenzoic acid 123843-55-0P, 2,6-Difluoro-4-pentylbenzoic acid 123843-56-1P 123843-57-2P 123843-58-3P 123843-59-4P 123843-60-7P 123843-61-8P 123843-63-0P 123843-64-1P 123843-65-2P, 2,6-Difluoro-4-methoxybenzoic acid 123843-66-3P 123843-67-4P 123843-68-5P 123864-93-7P 125369-56-4P, 2,6-Difluoro-4-methoxybenzoyl chloride 125369-57-5P 125369-58-6P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)
 (prepn. and reaction of, in prepn. of nematic liq. crystal)

IT 123843-69-6P 123843-70-9P 123843-71-0P 123843-72-1P
 123843-73-2P 123843-74-3P 123843-75-4P 123843-76-5P 123843-77-6P
 123843-78-7P 123843-79-8P 123843-80-1P 123843-81-2P 123843-83-4P
 123843-84-5P 123843-85-6P 123843-86-7P 123843-87-8P 123843-88-9P
 123843-89-0P 123843-90-3P 123843-91-4P 123843-92-5P 123843-93-6P
 123843-94-7P 123843-95-8P 123843-96-9P 123843-97-0P 123843-98-1P
 125369-59-7P
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of, as nematic liq. crystal)

IT 627-19-0, 1-Pentyne
 RL: RCT (Reactant)
 (substitution by, of bromofluorobenzonitrile, in prepn. of nematic liq. crystal)

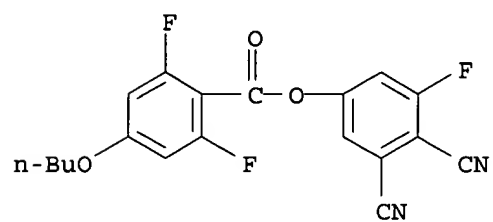
IT 123843-72-1P 125369-59-7P
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of, as nematic liq. crystal)

RN 123843-72-1 CAPLUS
 CN Benzoic acid, 2-fluoro-4-pentyl-, 4-cyano-3-fluorophenyl ester (9CI) (CA INDEX NAME)



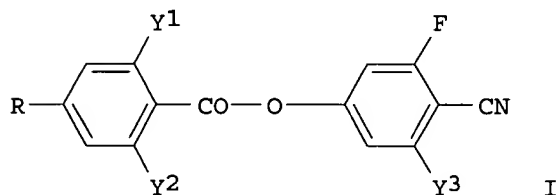
RN 125369-59-7 CAPLUS

CN Benzoic acid, 4-butoxy-2,6-difluoro-, 3,4-dicyano-5-fluorophenyl ester
(9CI) (CA INDEX NAME)



AN 1997:540181 CAPLUS
 DN 127:154707
 TI Nematic **liquid crystal** composition and **liquid crystal** device containing said composition
 IN Takeuchi, Kiyobumi; Takatsu, Haruyoshi; Ishida, Tokue
 PA Dainippon Ink and Chemicals, Inc., Japan
 SO Jpn. Kokai Tokkyo Koho, 14 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C09K019-46
 ICS C09K019-02; G02F001-13
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 75
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----|-------------------|------|----------|-----------------|----------|
| PI | JP 09157654 | A2 | 19970617 | JP 1995-324467 | 19951213 |
| OS | MARPAT 127:154707 | | | | |
| GI | | | | | |



AB The title compn. contains 5 wt.% to 60 wt.% **liq. crystal** component A and 10 wt.% to 95 wt.% **liq. crystal** component B; said component A contains one or more compds. represented by general formulas, e.g. I [R = alkyl; Y1 - Y3 = H, F; at least one of Y1 - Y3 is F]; said component B contains two or more compds. with permittivity anisotropy -2 to 2. For the title compn., the transition temp. between the nematic and isotropic phases is .gtoreq. 60.degree.C, and the transition temp. between the smectic and nematic phases is .ltoreq. -10.degree.C. The title device shows quick response.

ST nematic **liq crystal** compn; **liq crystal** device quick response

IT **Liquid crystal** displays
 (nematic **liq. crystal** compn. and **liq. crystal** device contg. said compn.)

IT

| | | | | |
|--------------------|-------------|-------------|-------------|-------------|
| 39969-28-3 | 39969-29-4 | 40817-08-1 | 61203-99-4 | 67589-39-3 |
| 67589-41-7 | 67589-46-2 | 67589-47-3 | 67589-52-0 | 67589-53-1 |
| 80944-44-1 | 84656-75-7 | 85312-59-0 | 85583-83-1 | 91526-01-1 |
| 92118-82-6 | 95480-29-8 | 95672-34-7 | 95906-34-6 | 96184-40-6 |
| 96184-42-8 | 100558-53-0 | 107949-21-3 | 107949-31-5 | 123843-70-9 |
| 123843-72-1 | 123843-73-2 | 123843-78-7 | 123843-82-3 | |
| 129738-34-7 | 129738-42-7 | 132123-39-8 | 133937-72-1 | 139215-80-8 |
| 142400-92-8 | 149705-67-9 | 153429-48-2 | 155041-85-3 | 155266-68-5 |
| 157690-02-3 | 159586-97-7 | 160910-17-8 | 168262-63-3 | 177572-85-9 |
| 183436-87-5 | 192519-67-8 | 193275-43-3 | 193275-57-9 | 193275-66-0 |
| 193275-68-2 | | | | |

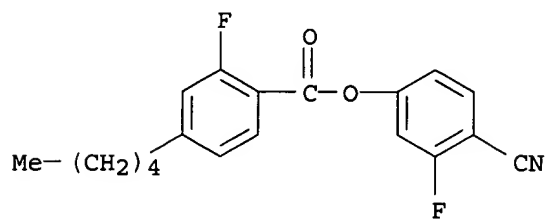
RL: TEM (Technical or engineered material use); USES (Uses)
 (nematic **liq. crystal** compn. and **liq. crystal** device contg. said compn.)

IT **123843-72-1**
 RL: TEM (Technical or engineered material use); USES (Uses)
 (nematic **liq. crystal** compn. and **liq. crystal** device contg. said compn.)

crystal device contg. said compn.)

RN 123843-72-1 CAPLUS

CN Benzoic acid, 2-fluoro-4-pentyl-, 4-cyano-3-fluorophenyl ester (9CI) (CA
INDEX NAME)



WEST

Generate Collection

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Search Results - Record(s) 1 through 9 of 9 returned.☐ 1. Document ID: US 6392736 B1

L48: Entry 1 of 9

File: USPT

May 21, 2002

DOCUMENT-IDENTIFIER: US 6392736 B1

TITLE: Method of manufacturing liquid crystal display element

Detailed Description Text (123):

The liquid crystal composition 28 may be used in any one of the modes such as a twisted nematic (TN) mode, a super twisted nematic (STN) mode, a ferroelectric liquid crystal (FLC) mode, an in-plane switching (IPS) mode, a vertical align (VA) mode, an electrically controlled birefringence (ECB) mode, a cholesteric-nematic phase transfer guest-host mode, a polymer-dispersed liquid crystal mode and a cholesteric selective reflection mode.

| | | | | | | | | | | | | | |
|------|-------|----------|-------|--------|----------------|------|-----------|-----------|-------------|--------|------|-----------|-------|
| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |
|------|-------|----------|-------|--------|----------------|------|-----------|-----------|-------------|--------|------|-----------|-------|

☐ 2. Document ID: US 6348245 B1

L48: Entry 2 of 9

File: USPT

Feb 19, 2002

DOCUMENT-IDENTIFIER: US 6348245 B1

TITLE: Polyimide photo alignment film from 3,3',4,4'-benzophenone tetracarboxylic dianhydride and ortho-substituted aromatic diamines for liquid crystal displays

Brief Summary Text (6):

In its simplest form a liquid crystal display device consists of a liquid crystal layer with opposite sides, a set of electrodes on either side of the liquid crystal layer and an alignment layer between each set of electrodes and the liquid crystal layer. The electrodes bearing the alignment layer are supported by substrates typically of glass or plastic. Alignment of the liquid crystal molecules occurs at a certain angle, referred to as the surface tilt angle or simply as the tilt angle, with respect to the plane of the inside of two substrates, e.g. glass plates, plastic sheets, quartz plates or others, which support the electrodes. The inside of the substrates have coatings of sets of transparent electrodes (electrical conductors), usually made of indium-tin oxide (ITO). The sets of electrodes are patterned, e.g. by etching, compatible with the information to be displayed by the LCD and with its driving method. Displays using the TN or the STN effect use electrodes on opposite sides of the liquid crystal layer in order to achieve the predominantly vertical electrical field required for the switching of the liquid crystals in these display modes. The TN effect is e.g. widely exploited in so called active matrix TN displays, which feature electronic active switching elements (e.g. TFTs or diodes) in each pixel. TN-displays are already widely used, for example in monitors for lap-top computers. Another display mode is the in-plane-switching (IPS) mode. Here the electrodes of one pixel are on the same side of the liquid crystal layer and switching is achieved by an essentially horizontal electrical field, i.e. an electrical field which is essentially parallel to the liquid crystal layer. IPS

displays are frequently addressed by a matrix of active elements (typically of TFTs). The process of establishing an alignment layer is most easily carried out by applying the orientation material (an organic polymer) via solution casting (spin coating, roller coating, dipping, spraying, printing and/or doctor blading) onto the substrates. After removal of the solvents and/or curing of the polymer layers, in most conventional displays the substrates are usually rubbed or buffed in one direction with cloths to establish an unique optical direction. After rubbing both substrates, they are rotated from 0 to 360 degrees with respect to each other, adhered together using organic adhesives and often appropriate spacers to preserve a constant thickness to a space or gap between the substrates; and filled with various mixtures of liquid crystal materials. At this stage, polarizing films and/or compensation films are often attached to the outside surfaces of the substrates by a lamination process. Finally, electrical connections are made to both substrates in a manner consistent with the electrical and display designs.

Brief Summary Text (56):

Light polarizer layers are deposited on both outside glass surfaces. The directions of polarization of the two polarizers are adjusted with respect to each other, depending on the specific cell configuration. The polarizer orientations are described, for example, in European Patent 0 131 216, European Patent 0 260 450 and DE 4000451 respectively, while other orientations can also be used. In active matrix addressed TN displays and in IPS displays, the two directions are either substantially perpendicular or substantially parallel to each other. In TN and STN cells the liquid crystals assume a spiral orientation through the thickness of the layer following the alignment of the liquid crystals by the two alignment layers which have directions from substantially 70.degree. to 360.degree. to each other. Twist angles, from 70.degree. to 120.degree. are particularly preferred for TN displays. Twist angles higher than 90.degree. can be obtained by adding a suitable doping component to the liquid crystal mixture. In IPS displays the liquid crystals can either be twisted (e.g. 90.degree.) or untwisted (e.g. 0.degree.) in the starting orientation.

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | Kwic | Draw Desc | Image |
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☐ 3. Document ID: US 6146718 A

L48: Entry 3 of 9

File: USPT

Nov 14, 2000

DOCUMENT-IDENTIFIER: US 6146718 A

TITLE: Liquid crystalline compound having a negative dielectric anisotropy value, liquid crystal composition containing the liquid crystalline compound, and liquid crystal display element produced utilizing the liquid crystal composition

Brief Summary Text (2):

The present invention relates to a novel liquid crystalline compound exhibiting properties suitable for liquid crystal compositions chiefly used in liquid crystal display elements of, for example, the vertical orientation system or various display systems, such as in-plane switching (IPS), the thin film transistor (TFT), twisted nematic (TN), or super twisted nematic (STN) systems, particularly in the vertical orientation system and the ISP display system; a liquid crystal composition containing such a liquid crystalline compound and having favorable properties; and a liquid display element produced utilizing such a liquid crystal composition. The term "liquid crystalline compound" used herein is a generic term for compounds which exhibit a liquid crystal phase, as well as compounds which do not exhibit a liquid crystal phase but which are useful as the components of liquid crystal compositions.

Brief Summary Text (20):

The object of the present invention is to solve the problems described above, and to

provide a novel liquid crystalline compound, a liquid crystal composition containing the liquid crystalline compound,, and a liquid crystal display element fabricated utilizing the liquid crystal composition, which can be used in a vertical orientation system as described in Japanese Patent Application Laid-open No.2-176625 and in various display systems using compounds or compositions having negative .DELTA..epsilon. values, such as IPS, ECB (HAN or DAP), DS, GH, or PC, as well as for the adjustment of properties of liquid crystal compositions for various display systems using compounds or compositions having positive .DELTA..epsilon. values, such as TN, STN, or AM (TFT or MIM) based on the TN mode.

Brief Summary Text (84):

More specifically, the compounds of the present invention or the liquid crystal compositions prepared from such compounds can be used in various display systems using compounds or compositions having negative .DELTA..epsilon. (for example, the homeotropic orientation system as disclosed in Japanese Patent Application Laid-open No. 2-176625, IPS, ECB (HAN or DAP), DS, GH, or PC), particularly in the homeotropic orientation system as disclosed in Japanese Patent Application Laid-open No. 2-176625 and IPS. Such compounds can be used not only in these systems, but also for improving or adjusting various properties (for example, .DELTA..epsilon., elastic coefficients, .DELTA.n, viscosity, or chemical and physical stability) of liquid crystal compositions for various display systems using compounds or compositions having positive .DELTA..epsilon. (for example, TN, STN, or TN-based AM (TFT or MIM)).

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☐ 4. Document ID: US 6139926 A

L48: Entry 4 of 9

File: USPT

Oct 31, 2000

DOCUMENT-IDENTIFIER: US 6139926 A

TITLE: Polyimide photo alignment film from 3,3,4,4-benzophenone tetracarboxylic dianhydride and ortho-substituted aromatic diamines for liquid crystal displays

Brief Summary Text (6):

In its simplest form a liquid crystal display device consists of a liquid crystal layer with opposite sides, a set of electrodes on either side of the liquid crystal layer and an alignment layer between each set of electrodes and the liquid crystal layer. The electrodes bearing the alignment layer are supported by substrates typically of glass or plastic. Alignment of the liquid crystal molecules occurs at a certain angle, referred to as the surface tilt angle or simply as the tilt angle, with respect to the plane of the inside of two substrates, e.g. glass plates, plastic sheets, quartz plates or others, which support the electrodes. The inside of the substrates have coatings of sets of transparent electrodes (electrical conductors), usually made of indium-tin oxide (ITO). The sets of electrodes are patterned, e.g. by etching, compatible with the information to be displayed by the LCD and with its driving method. Displays using the TN or the STN effect use electrodes on opposite sides of the liquid crystal layer in order to achieve the predominantly vertical electrical field required for the switching of the liquid crystals in these display modes. The TN effect is e.g. widely exploited in so called active matrix TN displays, which feature electronic active switching elements (e.g. TFTs or diodes) in each pixel. TN-displays are already widely used, for example in monitors for lap-top computers. Another display mode is the in-plane-switching (IPS) mode. Here the electrodes of one pixel are on the same side of the liquid crystal layer and switching is achieved by an essentially horizontal electrical field, i.e. an electrical field which is essentially parallel to the liquid crystal layer. IPS displays are frequently addressed by a matrix of active elements (typically of TFTs). The process of establishing an alignment layer is most easily carried out by applying the orientation material (an organic polymer) via solution casting (spin

coating, roller coating, dipping, spraying, printing and/or doctor blading) onto the substrates. After removal of the solvents and/or curing of the polymer layers, in most conventional displays the substrates are usually rubbed or buffed in one direction with cloths to establish a unique optical direction. After rubbing both substrates, they are rotated from 0 to 360 degrees with respect to each other; adhered together using organic adhesives and often appropriate spacers to preserve a constant thickness to a space or gap between the substrates; and filled with various mixtures of liquid crystal materials. At this stage, polarizing films and/or compensation films are often attached to the outside surfaces of the substrates by a lamination process. Finally, electrical connections are made to both substrates in a manner consistent with the electrical and display designs.

Brief Summary Text (51):

Light polarizer layers are deposited on both outside glass surfaces. The directions of polarization of the two polarizers are adjusted with respect to each other, depending on the specific cell configuration. The polarizer orientations are described, for example, in European Patent 0 131 216, European Patent 0 260 450 and DE 4000451 respectively, while other orientations can also be used. In active matrix addressed TN displays and in IPS displays, the two directions are either substantially perpendicular or substantially parallel to each other. In TN and STN cells the liquid crystals assume a spiral orientation through the thickness of the layer following the alignment of the liquid crystals by the two alignment layers which have directions from substantially 70.degree. to 360.degree. to each other. Twist angles, from 70.degree. to 120.degree. are particularly preferred for TN displays. Twist angles higher than 90.degree. can be obtained by adding a suitable doping component to the liquid crystal mixture. In IPS displays the liquid crystals can either be twisted (e.g. 90.degree.) or untwisted (e.g. 0.degree.) in the starting orientation.

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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments |
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☐ 5. Document ID: JP 2001114722 A

L48: Entry 5 of 9

File: DWPI

Apr 24, 2001

DERWENT-ACC-NO: 2002-109026

DERWENT-WEEK: 200215

COPYRIGHT 2002 DERWENT INFORMATION LTD

TITLE: Novel trans-cyclohexane-1, 4-diyl or 1, 4-phenylene liquid crystal-containing compounds for IPS, VA, ECB and GH mode systems

PRIORITY-DATA: 1999JP-0290548 (October 13, 1999)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|-----------------|----------------|----------|-------|-------------|
| JP 2001114722 A | April 24, 2001 | | 042 | C07C043/225 |

INT-CL (IPC): C07 C 43/225; C07 D 213/30; C07 D 237/08; C07 D 239/26; C07 D 309/04; C07 D 309/06; C07 D 319/06; C07 D 405/04; C07 D 407/04; C09 K 19/20; C09 K 19/28; C09 K 19/30; C09 K 19/34; C09 K 19/42; G02 F 1/13

ABSTRACTED-PUB-NO: JP2001114722A

BASIC-ABSTRACT:

NOVELTY - Liquid crystal compounds of formula (I) are new.

DETAILED DESCRIPTION - Liquid crystal compounds of formula (I) are new.

R1, R2 = 1-10C alkyl, in which any given methylenes are optionally substituted by -O-, -C (=O)-, -HC=CH- or -C equivalent to C- and any given hydrogens are optionally

substituted by halogen;

A, B, C = trans-cyclohexane-1, 4-diyl or 1, 4-phenylene;

Q = O, S, - (CH₂)₂O- or -O (CH₂)₂-;

Z1 - Z3 = single bond or 1-4C alkyl;

l, m, n = 0 or 1;

X1 - X4 = H, cyano, trifluoromethyl, trifluoromethoxy, F or Cl.

INDEPENDENT CLAIMS are also included for:

(1) new liquid crystal compositions containing:

(a) (I) as the primary constituent and compounds of formulas (II), (III) and/or (IV) as the secondary constituent;

(b) (I) as the primary constituent and compounds of formulas (V) and/or (VI) as the secondary constituent;

(c) (I) as the primary constituent and compounds of formulas (VII), (VIII) and/or (IX) as the secondary constituent;

(d) (I) as the primary constituent, (II), (III) and/or (IV) as the secondary constituent and (X), (XI) and/or (XII) as the tertiary constituent;

(e) (I) as the primary constituent, (V) and/or (VI) as the secondary constituent and (X), (XI) and/or (XII) as the tertiary constituent;

(f) (I) as the primary constituent, (VII), (VIII) and/or (IX) as the secondary constituent and (X), (XI) and/or (XII) as the tertiary constituent; or

(g) (I) as the primary constituent, (II), (III) and/or (IV) as the secondary constituent, (V) and/or (VI) as the tertiary constituent;

(2) new liquid crystal composition containing the present liquid crystal composition from (a) - (g) and optically active compounds; and

(3) a new liquid crystal display device composed using the present liquid crystal composition.

R3 = 1-10C alkyl optionally substituted;

Y1 = F, Cl, -OCF₃-, -OCF₂H-, -CF₂H-, -CFH₂-, -OCF₂CF₂H-, -OCF₂CFHCF₃- or -CF₃;

L1, L2 = H or F;

Z5, Z6 = -CH₂CH₂-, - (CH₂)₄-, -COO-, -CF₂O-, -OCF₂-, -CH=CH- or single bond;

D = trans-cyclohexane-1, 4-diyl, 1, 3-dioxane-2, 5-diyl or 1, 4-phenylene;

E = trans-cyclohexane-1, 4-diyl or 1, 4-phenylene.

R4, R5 = 1-10C alkyl optionally substituted;

Y2 = -CN or -C equivalent to C-CN;

F = trans-cyclohexane-1, 4-diyl, 1, 3-dioxane-2, 5-diyl, pyrimidine-2, 5-diyl or 1, 4-phenylene;

G = cyclohexane-1, 4-diyl, pyrimidine-2, 5-diyl or 1, 4-phenylene;

H = trans-cyclohexane-1, 4-diyl or 1, 4-phenylene;

Z7 = -CH₂CH₂-, -COO- or single bond;

L3 - L5 = H or F;

b, c, d = 0 or 1.

R6, R7 = 1-10C alkyl optionally substituted;

I, J = trans-1, 4-cyclohexylene or 1, 4-phenylene;

Z8, Z9 = - (CH₂)₂-, -COO- or single bond;

L6, L7 = H or F.

R8, R9 = 1-10C alkyl optionally substituted;

K, L, M = trans-1, 4-cyclohexylene, pyrimidine-2, 5-diyl or 1, 4-phenylene;

Z10, Z11 = -C equivalent to C-, -COO-, - (CH₂)₂-, -CH=CH- or single bond.

USE - Used as liquid crystal composition for IPS, VA, ECB and GH mode systems and for TN, STN and AM systems.

ADVANTAGE - Having extremely high dielectric constant anisotropy and low optical anisotropy simultaneously and being good in compatibility with other liquid crystal materials. As a result, a liquid crystal composition with low threshold voltage and low optical anisotropy is realized.

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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments |
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☐ 6. Document ID: US 6146718 A EP 964048 A1 JP 11349582 A

L48: Entry 6 of 9

File: DWPI

Nov 14, 2000

DERWENT-ACC-NO: 2000-055360

DERWENT-WEEK: 200060

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TITLE: New liquid crystal compounds having large absolute negative anisotropy value

INVENTOR: HASEBA, Y; MATSUI, S ; MIYAZAWA, K ; TAKEUCHI, H ; YANO, H

PRIORITY-DATA: 1998JP-0178135 (June 10, 1998)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|---------------|-------------------|----------|-------|------------|
| US 6146718 A | November 14, 2000 | | 000 | C09K019/30 |
| EP 964048 A1 | December 15, 1999 | E | 044 | C09K019/34 |
| JP 11349582 A | December 21, 1999 | | 034 | C07D309/08 |

INT-CL (IPC): C07 D 309/02; C07 D 309/08; C07 D 309/28; C07 D 309/30; C07 D 315/00; C07 D 407/10; C09 K 19/04; C09 K 19/30; C09 K 19/34; G02 F 1/13

ABSTRACTED-PUB-NO: EP 964048A

BASIC-ABSTRACT:

NOVELTY - Liquid crystalline compounds having a structure comprising 6,6-difluorotetrahydropyran-2,5-diyl, 6,6-difluoro-2,3-dihydro-6H-pyran-2-,5-diyl and/or 6-fluoro-3,4-dihydro-2H-pyran-2,5-diyl in their skeleton are new.

DETAILED DESCRIPTION - Liquid crystalline compounds of formula (I) are new.

$R_1(A_1-X_1)_l-(A_2-X_2)_m-(A_3-X_3)_n-(A_4-X_4)_o-(A_5)_p-Y_1$ (I)

R_1 , Y_1 = H, halogen, cyano, cyanate, isocyano, isothiocyanate or 1-20C alkyl with nonadjacent methylene groups optionally substituted by O, S, N, C equivalent to C, dialkylsilylene, monoalkylsilylene, silylene or vinylene and with hydrogen atoms optionally substituted by F or Cl;

X_1 , X_2 , X_3 , X_4 = single bond, $-(CH_2)_2-$, $-CH=CH-$, $-C$ equivalent to $C-$, $-COO-$, $-OCO-$, $-CH_2O-$, $-OCH_2-$, $-(CH_2)_4-$, $-(CH_2)_3O-$, $-O(CH_2)_3-$, $-CH=CHCH_2CH_2-$, $-CH_2CH=CHCH_2-$, $-CH_2CH_2CH=CH-$, $-CH=CHCH=CH-$, $-CF_2O-$, $-OCF_2-$, $-CH=CHCH_2O-$, $-OCH_2CH=CH-$, $-CF=CF-$, $-CH_2CF_2-$, $-CF_2CH_2-$, $-(CF_2)_2-$, $-(CF_2)_4-$, $-(CH_2)_2COO-$, $-OCO(CH_2)_2-$, $-CH=CHCOO-$, $-OCOCH=CH-$, $-CH=CH-C$ equivalent to $C-$ or $-C$ equivalent to $C-CH=CH-$;

rings A_1 , A_2 , A_3 , A_4 = trans-cyclohexane-1,4-diyl, cyclohexa-1-ene-1,4-diyl, 1,4-phenylene, bicyclo(1.1.1)pentane-1,3-diyl, 6,6-difluorotetrahydropyran-2,5-diyl, 6,6-difluoro-2,3-dihydro-6H-pyran-2-,5-diyl or 6-fluoro-3,4-dihydro-2H-pyran-2,5-diyl with ring C atoms optionally substituted by N, O or S and with H atoms on the ring optionally substituted by halogen or cyano, provided that at least one of

the rings is one of the pyranyl systems; and

l , m , n , o , p = 0 or 1, provided that $l + m + n + o + p$ at least 1.

Any atom may be substituted by its isotope.

INDEPENDENT CLAIMS are included for liquid crystal compositions containing (I) and display elements utilizing these compositions.

USE - (I) are used in liquid crystal compositions (claimed). The compositions may be used to fabricate liquid crystal display elements (claimed) of, for example, the vertical orientation system or various display systems such as in-plane switching (IPS), thin film transistor (TFT), twisted nematic (TN) or super twisted nematic (STN) systems.

ADVANTAGE - The liquid crystalline compounds have low viscosity, a large absolute value of negative dielectric anisotropy, controlled optical anisotropy value, high specific resistance, high voltage holding ratio and high stability against heat and ultraviolet radiation. They are highly miscible with other liquid crystalline compounds and readily form liquid crystal compositions of negative anisotropy with a wide range of such compounds.

ABSTRACTED-PUB-NO:

US 6146718A EQUIVALENT-ABSTRACTS:

NOVELTY - Liquid crystalline compounds having a structure comprising 6,6-difluorotetrahydropyran-2,5-diyl, 6,6-difluoro-2,3-dihydro-6H-pyran-2-,5-diyl and/or 6-fluoro-3,4-dihydro-2H-pyran-2,5-diyl in their skeleton are new.

DETAILED DESCRIPTION - Liquid crystalline compounds of formula (I) are new.

$R_1(A_1-X_1)_l-(A_2-X_2)_m-(A_3-X_3)_n-(A_4-X_4)_o-(A_5)_p-Y_1$ (I)

R_1 , Y_1 = H, halogen, cyano, cyanate, isocyano, isothiocyanate or 1-20C alkyl with nonadjacent methylene groups optionally substituted by O, S, N, C equivalent to C, dialkylsilylene, monoalkylsilylene, silylene or vinylene and with hydrogen atoms optionally substituted by F or Cl;

X_1 , X_2 , X_3 , X_4 = single bond, $-(CH_2)_2-$, $-CH=CH-$, $-C$ equivalent to $C-$, $-COO-$, $-OCO-$, $-CH_2O-$, $-OCH_2-$, $-(CH_2)_4-$, $-(CH_2)_3O-$, $-O(CH_2)_3-$, $-CH=CHCH_2CH_2-$, $-CH_2CH=CHCH_2-$, $-CH_2CH_2CH=CH-$, $-CH=CHCH=CH-$, $-CF_2O-$, $-OCF_2-$, $-CH=CHCH_2O-$, $-OCH_2CH=CH-$, $-CF=CF-$, $-CH_2CF_2-$, $-CF_2CH_2-$, $-(CF_2)_2-$, $-(CF_2)_4-$, $-(CH_2)_2COO-$, $-OCO(CH_2)_2-$, $-CH=CHCOO-$, $-OCOCH=CH-$, $-CH=CH-C$ equivalent to $C-$ or $-C$ equivalent to $C-CH=CH-$;

rings A1, A2, A3, A4 = trans-cyclohexane-1,4-diyl, cyclohexa-1-ene-1,4-diyl, 1,4-phenylene, bicyclo(1.1.1)pentane-1,3-diyl, 6,6-difluorotetrahydropyran-2,5-diyl, 6,6-difluoro-2,3-dihydro-6H-pyran-2-,5-diyl or 6-fluoro-3,4-dihydro-2H-pyran-2,5-diyl with ring C atoms optionally substituted by N, O or S and with H atoms on the ring optionally substituted by halogen or cyano, provided that at least one of the rings is one of the pyranyl systems; and

l, m, n, o, p = 0 or 1, provided that l + m + n + o + p at least 1.

Any atom may be substituted by its isotope.

INDEPENDENT CLAIMS are included for liquid crystal compositions containing (I) and display elements utilizing these compositions.

USE - (I) are used in liquid crystal compositions (claimed). The compositions may be used to fabricate liquid crystal display elements (claimed) of, for example, the vertical orientation system or various display systems such as in-plane switching (IPS), thin film transistor (TFT), twisted nematic (TN) or super twisted nematic (STN) systems.

ADVANTAGE - The liquid crystalline compounds have low viscosity, a large absolute value of negative dielectric anisotropy, controlled optical anisotropy value, high specific resistance, high voltage holding ratio and high stability against heat and ultraviolet radiation. They are highly miscible with other liquid crystalline compounds and readily form liquid crystal compositions of negative anisotropy with a wide range of such compounds.

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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments |
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☐ 7. Document ID: US 20020084444 A1 GB 2334031 A DE 19903746 A1 JP 11302652 A KR 99072364 A US 6139925 A

L48: Entry 7 of 9

File: DWPI

Jul 4, 2002

DERWENT-ACC-NO: 1999-432471

DERWENT-WEEK: 200247

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TITLE: Liquid-crystal mixture used in the adjustment of the resistance of liquid crystal compositions

INVENTOR: DARIUS, M; HECKMEIER, M ; KIRSCH, P ; REIFFENRATH, V ; REUTER, M ; RIEGER, B ; TARUMI, K ; REIGER, B

PRIORITY-DATA: 1998DE-1051805 (November 11, 1998), 1998DE-1004300 (February 4, 1998), 1998DE-1005912 (February 13, 1998), 1999DE-1002606 (January 23, 1999)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|-------------------|--------------------|----------|-------|-------------|
| US 20020084444 A1 | July 4, 2002 | | 000 | C09K019/12 |
| GB 2334031 A | August 11, 1999 | | 078 | C07C255/53 |
| DE 19903746 A1 | August 5, 1999 | | 000 | C07C039/367 |
| JP 11302652 A | November 2, 1999 | | 030 | C09K019/42 |
| KR 99072364 A | September 27, 1999 | | 000 | C09K019/02 |
| US 6139925 A | October 31, 2000 | | 000 | C09K019/00 |

INT-CL (IPC): C07 C 25/13; C07 C 39/367; C07 C 39/42; C07 C 255/50; C07 C 255/53; C07 C 255/55; C09 K 19/00; C09 K 19/02; C09 K 19/08; C09 K 19/12; C09 K 19/30; C09 K 19/34; C09 K 19/42; C09 K 19/46; C09 K 19/52; G02 F 1/13; G09 F 9/35

ABSTRACTED-PUB-NO: GB 2334031A
BASIC-ABSTRACT:

NOVELTY - The liquid-crystal mixture has a certain specific resistance and comprises an acidic compound.

DETAILED DESCRIPTION - A liquid-crystal mixture has a certain specific resistance and comprises an acidic compound in a concentration of 10 ppm to less than 10%.

An INDEPENDENT CLAIM is also included for a method of adjusting the specific resistance of the liquid-crystal mixture comprising adding an acidic compound.

USE - The liquid-crystal mixture is used in STN, AMD, TN or IPS liquid crystal displays.

ADVANTAGE - The liquid-crystal displays have prespecified specific resistance values and the specific resistance of the liquid-crystals can be adjusted reproducibly.
ABSTRACTED-PUB-NO:

US 6139925A EQUIVALENT-ABSTRACTS:

NOVELTY - The liquid-crystal mixture has a certain specific resistance and comprises an acidic compound.

DETAILED DESCRIPTION - A liquid-crystal mixture has a certain specific resistance and comprises an acidic compound in a concentration of 10 ppm to less than 10%.

An INDEPENDENT CLAIM is also included for a method of adjusting the specific resistance of the liquid-crystal mixture comprising adding an acidic compound.

USE - The liquid-crystal mixture is used in STN, AMD, TN or IPS liquid crystal displays.

ADVANTAGE - The liquid-crystal displays have prespecified specific resistance values and the specific resistance of the liquid-crystals can be adjusted reproducibly.

US20020084444A

NOVELTY - The liquid-crystal mixture has a certain specific resistance and comprises an acidic compound.

DETAILED DESCRIPTION - A liquid-crystal mixture has a certain specific resistance and comprises an acidic compound in a concentration of 10 ppm to less than 10%.

An INDEPENDENT CLAIM is also included for a method of adjusting the specific resistance of the liquid-crystal mixture comprising adding an acidic compound.

USE - The liquid-crystal mixture is used in STN, AMD, TN or IPS liquid crystal displays.

ADVANTAGE - The liquid-crystal displays have prespecified specific resistance values and the specific resistance of the liquid-crystals can be adjusted reproducibly.

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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments |
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☐ 8. Document ID: WO 9921815 A1 EP 1026142 A1

L48: Entry 8 of 9

File: DWPI

May 6, 1999

DERWENT-ACC-NO: 1999-326669

DERWENT-WEEK: 200171

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TITLE: Novel 2,3-difluorophenyl derivatives

INVENTOR: MIYAZAWA, K; NAKAGAWA, E ; TAKESHITA, F ; TAKEUCHI, H ; YAGI, Y ; YAGI, H

PRIORITY-DATA: 1997JP-0309919 (October 24, 1997)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|---------------|----------------|----------|-------|-------------|
| WO 9921815 A1 | May 6, 1999 | J | 087 | C07C043/225 |
| EP 1026142 A1 | August 9, 2000 | E | 000 | C07C043/225 |

INT-CL (IPC): C07 C 25/18; C07 C 43/225; C07 C 69/74; C07 C 69/76; C07 D 309/06; C07 D 319/06; C09 K 19/10; C09 K 19/20; C09 K 19/30; C09 K 19/34; C09 K 19/42; G02 F 1/13

ABSTRACTED-PUB-NO: WO 9921815A

BASIC-ABSTRACT:

NOVELTY - 2,3-difluorophenyl derivatives (I) are new.

DETAILED DESCRIPTION - 2,3-difluorophenyl derivatives of formula (I) are new.

Ra, Rb = 1-10C alkyl or alkoxy (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there is no neighbouring -O-, and at least one methylene is substituted by cyclopropane-1,2-diyl, -CF2- or -CFH-); A1-A4 = cyclohexane-1,4-diyl or 1,4-phenylene (non-adjacent methylene may be substituted by -O-; H may be substituted by halogen; A3 and/or A4 = 2,3-difluoro-1,4-phenylene); Z1, Z2, Z3 = single bond, -(CH2)p, -CO2-, -CF2O- or -CH2O-; m, n = 0 or 1.

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed); used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) modes.

ADVANTAGE - The compounds have excellent compatibility even at low temperatures, and combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

| | | | | | | | | | |
|------|-------|----------|-------|--------|----------------|------|-----------|-----------|-------------|
| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments |
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☐ 9. Document ID: US 20020030179 A1 WO 9921816 A1 EP 1026143 A1 US 6348244 B1

L48: Entry 9 of 9

File: DWPI

Mar 14, 2002

DERWENT-ACC-NO: 1999-312917

DERWENT-WEEK: 200222

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TITLE: Novel liquid crystal compounds for displays

INVENTOR: KUBO, Y; MIYAZAWA, K ; NAKAGAWA, E ; TAKESHITA, F ; TAKEUCHI, H

PRIORITY-DATA: 1997JP-0309918 (October 24, 1997)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|-------------------|-------------------|----------|-------|-------------|
| US 20020030179 A1 | March 14, 2002 | | 000 | C09K019/52 |
| WO 9921816 A1 | May 6, 1999 | J | 076 | C07C043/225 |
| EP 1026143 A1 | August 9, 2000 | E | 000 | C07C043/225 |
| US 6348244 B1 | February 19, 2002 | | 000 | C09K019/34 |

INT-CL (IPC): C07 C 25/18; C07 C 43/225; C07 C 309/06; C07 C 319/06; C07 D 309/06; C07 D 319/06; C09 K 19/30; C09 K 19/34; C09 K 19/42; C09 K 19/52; G02 F 1/13

ABSTRACTED-PUB-NO: US 6348244B
BASIC-ABSTRACT:

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

ABSTRACTED-PUB-NO:

US20020030179A EQUIVALENT-ABSTRACTS:

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for

TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

WO 9921816A

Full Title Citation Front Review Classification Date Reference Sequences Attachments

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| Term | Documents |
|--|-----------|
| LIQUID.DWPI,TDBD,EPAB,JPAB,USPT. | 1769778 |
| LIQ.DWPI,TDBD,EPAB,JPAB,USPT. | 309655 |
| LIQS.DWPI,TDBD,EPAB,JPAB,USPT. | 11227 |
| LIQUIDS.DWPI,TDBD,EPAB,JPAB,USPT. | 220627 |
| CRYSTAL.DWPI,TDBD,EPAB,JPAB,USPT. | 622641 |
| CRYSTALS.DWPI,TDBD,EPAB,JPAB,USPT. | 181683 |
| MATERIAL.DWPI,TDBD,EPAB,JPAB,USPT. | 4400161 |
| MATERIALS.DWPI,TDBD,EPAB,JPAB,USPT. | 1643558 |
| MIXTURE.DWPI,TDBD,EPAB,JPAB,USPT. | 1254358 |
| MIXT.DWPI,TDBD,EPAB,JPAB,USPT. | 394615 |
| (L47 SAME (LIQUID CRYSTAL MATERIAL OR LIQUID CRYSTAL MIXTURE OR LIQUID RYSTAL MEDIUM OR LIQUID CRYSTAL COMPOSITION) SAME (SUITABLE OR USEFUL OR USED)).USPT,JPAB,EPAB,DWPI,TDBD. | 9 |

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L39: Entry 4 of 5

File: DWPI

Jun 17, 1997

DERWENT-ACC-NO: 1997-369777

DERWENT-WEEK: 199734

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TITLE: Nematic liquid crystal compositions for display devices having higher response speed - containing fluorine and cyano group substituted aromatic esters

PRIORITY-DATA: 1995JP-0324467 (December 13, 1995)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|---------------|---------------|----------|-------|------------|
| JP 09157654 A | June 17, 1997 | | 014 | C09K019/46 |

INT-CL (IPC): C09 K 19/02; C09 K 19/46; G02 F 1/13

ABSTRACTED-PUB-NO: JP09157654A

BASIC-ABSTRACT:

A nematic liquid crystal composition with a nematic-to-isotropic liquid crystal phase transition temperature (T_{n-i}) of at least 60 degrees C and a crystal-or-smectic-to-nematic phase transition temperature (T_n) of up to -10 degrees C consists of 3-40 compounds and containing 5-60wt.% of liquid crystal component (A) made up of at least one compound of formulae (I-1) and (I-2) (R₁₁ and R₁₂ = 2-5C alkyl; Y₁₁-Y₁₆ = H or F) and 10-95wt.% of liquid crystal component (B) made up of at least two compounds with an anisotropy of dielectric constant (Δε) of -2 to +2. Also claimed are twisted nematic (TN) and super twisted nematic (STN) liquid crystal display devices using the nematic liquid crystal compositions.

ADVANTAGE - (I-1) and (I-2) even in a small amount can give nematic liquid crystal compositions with higher response speed and improved flickering and crosstalk phenomenon capable of driving at a low temperature and/or on low voltage. the liquid crystal composition with a large double refraction among the nematic liquid crystal compositions can reduce the liquid crystal layer thickness and thus improve response. TN and STN liquid crystal display devices have excellent driving and display properties even with a large amount of information.

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L48: Entry 9 of 9

File: DWPI

Mar 14, 2002

DERWENT-ACC-NO: 1999-312917

DERWENT-WEEK: 200222

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TITLE: Novel liquid crystal compounds for displays

INVENTOR: KUBO, Y; MIYAZAWA, K ; NAKAGAWA, E ; TAKESHITA, F ; TAKEUCHI, H

PRIORITY-DATA: 1997JP-0309918 (October 24, 1997)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|-------------------|-------------------|----------|-------|-------------|
| US 20020030179 A1 | March 14, 2002 | | 000 | C09K019/52 |
| WO 9921816 A1 | May 6, 1999 | J | 076 | C07C043/225 |
| EP 1026143 A1 | August 9, 2000 | E | 000 | C07C043/225 |
| US 6348244 B1 | February 19, 2002 | | 000 | C09K019/34 |

INT-CL (IPC): C07 C 25/18; C07 C 43/225; C07 C 309/06; C07 C 319/06; C07 D 309/06;
C07 D 319/06; C09 K 19/30; C09 K 19/34; C09 K 19/42; C09 K 19/52; G02 F 1/13

ABSTRACTED-PUB-NO: US 6348244B

BASIC-ABSTRACT:

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

ABSTRACTED-PUB-NO:

US20020030179A EQUIVALENT-ABSTRACTS:

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical

orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

NOVELTY - Liquid crystal compounds (I) are new.

DETAILED DESCRIPTION - Liquid-crystal compounds of formula (I) are new.

Ra, Rb = 1-10C linear or branched alkyl (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there are no neighboring -O- groups); A1 = cyclohexane-1,4-diyl (non-adjacent methylenes may be substituted by -O-); A2 = 2,3-difluoro-1,4-phenylene (H at 5- and 6- positions may be substituted by F); Z1, Z2 = single bond or -CH2CH2-; Xa, Xb, Xc, Xd = H, F or Cl (at least one = F or Cl).

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed), used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) methods.

ADVANTAGE - The compounds combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

WO 9921816A

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L48: Entry 8 of 9

File: DWPI

May 6, 1999

DERWENT-ACC-NO: 1999-326669
DERWENT-WEEK: 200171
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TITLE: Novel 2,3-difluorophenyl derivatives

INVENTOR: MIYAZAWA, K; NAKAGAWA, E ; TAKESHITA, F ; TAKEUCHI, H ; YAGI, Y ; YAGI, H

PRIORITY-DATA: 1997JP-0309919 (October 24, 1997)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|---------------|----------------|----------|-------|-------------|
| WO 9921815 A1 | May 6, 1999 | J | 087 | C07C043/225 |
| EP 1026142 A1 | August 9, 2000 | E | 000 | C07C043/225 |

INT-CL (IPC): C07 C 25/18; C07 C 43/225; C07 C 69/74; C07 C 69/76; C07 D 309/06; C07 D 319/06; C09 K 19/10; C09 K 19/20; C09 K 19/30; C09 K 19/34; C09 K 19/42; G02 F 1/13

ABSTRACTED-PUB-NO: WO 9921815A

BASIC-ABSTRACT:

NOVELTY - 2,3-difluorophenyl derivatives (I) are new.

DETAILED DESCRIPTION - 2,3-difluorophenyl derivatives of formula (I) are new.

Ra, Rb = 1-10C alkyl or alkoxy (any methylene may be substituted by -O-, -CH=CH- or -C equivalent to C, provided there is no neighbouring -O-, and at least one methylene is substituted by cyclopropane-1,2-diyl, -CF₂- or -CFH-); A1-A4 = cyclohexane-1,4-diyl or 1,4-phenylene (non-adjacent methylene may be substituted by -O-; H may be substituted by halogen; A3 and/or A4 = 2,3-difluoro-1,4-phenylene); Z1, Z2, Z3 = single bond, -(CH₂)_p, -CO₂-, -CF₂O- or -CH₂O-; m, n = 0 or 1.

USE - For liquid crystal compositions (claimed) for liquid crystal display elements (claimed); used as components for IPS (iso-plane switching) and VA (vertical orientation) methods, ECB (birefringence control) and GH (guest-host) modes, and for TN (twisted nematic), STN (super-twisted nematic) and AM (active nematic) modes.

ADVANTAGE - The compounds have excellent compatibility even at low temperatures, and combine an extremely large negative permittivity anisotropy with a small optical anisotropy.

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L39: Entry 3 of 5

File: JPAB

Jun 17, 1997

PUB-NO: JP409157654A

DOCUMENT-IDENTIFIER: JP 09157654 A

TITLE: NEMATIC LIQUID CRYSTAL COMPOSITION AND LIQUID CRYSTAL DISPLAY DEVICE USING THE SAME

PUBN-DATE: June 17, 1997

INVENTOR-INFORMATION:

NAME

COUNTRY

TAKEUCHI, KIYOBUMI

TAKATSU, HARUYOSHI

ISHIDA, TOKUE

INT-CL (IPC): C09 K 19/46; C09 K 19/02; G02 F 1/13

ABSTRACT:

PROBLEM TO BE SOLVED: To obtain a nematic liquid crystal composition having a prescribed phase transition temperature, comprising a mixture of specific liquid crystal components, useful as a liquid crystal display device drivable at a low temperature/low voltage by addition of a small amount, excellent in high-speed responsiveness, improved in flicker of display screen and cross talk phenomena.

SOLUTION: This composition comprises 3-40 kinds of compounds and is composed of (A) 5-60wt.% of a liquid crystal component consisting of one or more selected from among a compound of formula I (R11 is a 2-5C straight-chain alkyl; Y11 to Y13 are each H or F and one or more of Y11 to Y13 are F) and a compound of formula II (R12 is R11; Y14 to Y16 are each as shown for Y11 to Y13) and (B) 10-95wt.% of a liquid crystal component consisting of two or more compounds having -2 to 2 dielectric anisotropy ($\Delta\epsilon$) [e.g. a compound of formula III (R21 is a 2-7C straight-chain alkyl, etc.; R24 is a 1-7C straight-chain alkyl, etc.; Z21 and Z22 are each a single bond, ethylene, etc.; (m) is 0 or 1)]. The composition has $\geq 60^\circ\text{C}$ nematic phase-isotropic liquid phase transition temperature and $\leq -10^\circ\text{C}$ smectic phase-nematic phase transition temperature.

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| Total (1) | 37 | 37 | 0 |